

REMARKS

Applicants thank the Examiner for the thorough examination of the application. The specification has been amended to correct a minor error. No new matter is believed to be added to the application by this Reply.

Entry of Reply

Entry of this Reply under 37 C.F.R. §1.116 is respectfully requested because it places the application into allowance or, alternately, in better form for appeal.

Status of the Claims

Claims 1-11 are pending in the application. Claims 4-7 and 9-11 are allowed. Claims 1-3 and 8 stand rejected.

Rejection Under 35 U.S.C. §103(a) Over Hamajima and Tourtellotte

Claims 1-3 and 8 are rejected under 35 U.S.C. §103(a) as being obvious over Hamajima (U.S. Patent 5,208,498) in view of Tourtellotte (U.S. Patent 3,536,941). Applicants traverse.

The Present Invention and its Advantages

The present invention pertains to a reciprocating motor that uses an insulating member to optimize the flux. The invention finds a typical embodiment in claim 1, which sets forth:

1. A reciprocating motor comprising:
an outer core having a plurality of single cores constructed with consecutively-stacked lamination sheets centering around a plurality

of ring-shaped winding coils so as form a cylindrical structure, and a magnetically insulating member placed between the single cores so that fluxes formed in the plurality of single cores by currents flowing through the winding coils are isolated from each other by the insulating member;

an inner core inserted in the outer core so as to leave a predetermined gap with an inside circumferential face of the outer core; and

a moving part having a plurality of magnet rows confronting the winding coils of the outer core respectively so as to reciprocate in accordance with a variation of currents flowing through the winding coils.

Distinctions of the Invention Over the Applied Art

Hamajima pertains to a linear actuator. Figure 3 of Hamajima shows a non-magnetic shaft 51 being reciprocated by a Stirling engine 52. Ring shaped moving cores 53 are separated by a first spacer 54. Ring shaped stationary cores 56 are separated by a second spacer 63.

Hamajima fails to disclose or suggest a coil configuration for maximizing flux, such as the inventive winding coil 110, the single coil 120 and the lamination sheet K. The Examiner admits that Hamajima also fails to disclose an inner core inserted into the outer core.

The failures of Hamajima arise from fundamentally different technical goals. Hamajima pertains to a linear actuator that transduces energy supplied by a Stirling engine. Hamajima is a generator, not a motor. Hamajima does not have a moving part which reciprocates "in accordance with a variation of currents flowing through the windings", as claimed. Instead, the moving part of Hamajima produces a current in the windings.

In Hamajima, the motion produces a current. In the invention, the current produces the motion.

The invention is a reciprocating motor that has virtually the opposite goal of converting electrical current into reciprocating motion. As a result, the technology of Hamajima would not be faced with the problem of flux saturation that the present invention solves.

The Examiner turns to Tourtellotte for teachings pertaining to inner cores. However, Tourtellotte fails to address the failure of Hamajima to disclose or suggest a technology to maximize flux in a reciprocating motor. In addition, Hamajima uses a moving inner shaft (11,51) which is solid as evidenced by Figs. 2 & 4, and provides no ability to locate an inner core as the Examiner proposes. Also, since Hamajima pertains to a linear actuator and Tourtellotte pertains to a synchronous electric motor with a reciprocating armature, the fundamental differences in the two non-analogous technologies would not motivate one having ordinary skill to combine the references. The Examiner is relying on Applicants' disclosure as a roadmap to piece together two divergent references in an attempt to lessen the value of the claimed invention, which is not permissible.

Hamajima and Tourtellotte therefore would fail to motivate one of ordinary skill to produce the invention embodied in claim 1. A *prima facie* case of obviousness has thus not been made. Claims dependent upon claim 1 are patentable for at least the above reasons.

This rejection is accordingly overcome and withdrawal thereof is respectfully requested.

Drawings

In response to the PTO-948 form dated November 18, 2003, please find attached amended Figure 1 that is drawn in a scale large enough to show the mechanism without crowding when the drawing is reduced in size to two-thirds in reproduction.

Foreign Priority

The Examiner has acknowledged foreign priority.

Conclusion

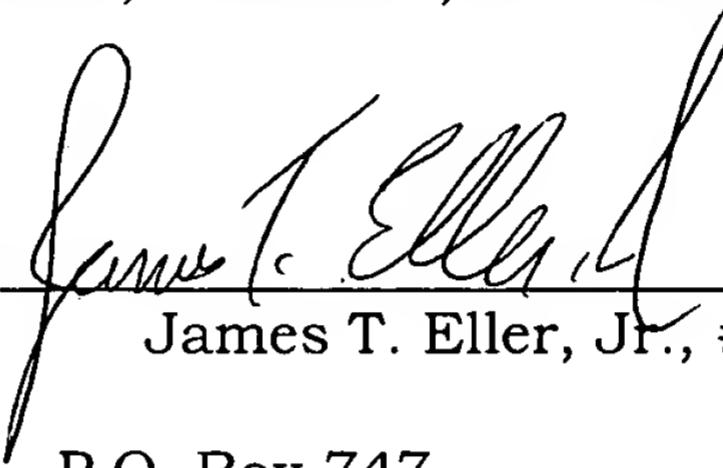
Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Robert E. Goozner, Ph.D. (Reg. No. 42,593) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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By


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Attachment(s)